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Mr. Carrington's collection consists of—

Three folio volumes drawings of Sun-Spots, made on a scale of 12 inches to the Sun's diameter. In all cases the whole of the Sun's disk has been drawn, and the positions of the north point and the Sun's axis have been marked upon the page with great care. The places of the spots and the general outline of the groups and penumbræ were, it is believed, laid down by means of an enlarged image of the Sun, which was thrown upon the drawing paper; and the details were afterwards roughly sketched in without any pretension to great accuracy.

Three large quarto volumes of observations of the Positions of Spots. These observations were made by observing the intervals of time between the transits of the spots and the transits of the preceding and following limbs of the Sun across wires in a fixed telescope.

Seven large quarto volumes, containing the reductions of the above observations.

And a folio volume, filled with drawings of groups of Spots as seen upon successive days, placed one below the other on the page, so as to show at a glance the history of the group, and its drift in heliocentric latitude and longitude. A. C. R.

Note on a Starlit Transit Eyepiece.

By Dr. Royston-Pigott, M.A., F.R.S., &c.

In review of the recent weather, so hostile to nice observations, it is with some diffidence that I venture to draw the attention of the Society to the little contrivance which I have named the *Starlit Transit Eyepiece*, as its name implies, self-illuminating.

It essentially consists of transparent lines drawn on a film of silver of a fine blue tint, deposited by Martin's process on a disk of glass. This film admits the view of a star, which can be seen passing across the field and flashing brightly at the instant of transit across the vertical parallel transparent lines. The breadth of the lines can be regulated so that more or less of the spurious disk of a star can be shown in transit. For a 60-inch Transit—the size of the instrument I employ—the lines are ruled $\frac{1}{20}$th of an inch apart, which gives 11·4 seconds of time for the transit of an equatoreal star; spaces of $\frac{1}{20 \cdot 1}$ give 12 seconds.

The lines can be ruled with great exactitude within a 10,000th of an inch: 1,000th of an inch corresponds nearly to a quarter of a second, and 10,000th to the fortieth part of a second. In the centre, below the film, is an indicator, visible by star-light, showing the central line; and the film is removed at the sides so as to show the approach of the star to the transparent lines,

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three, five, or seven in number, according to the requirements of the observer.

The films also can be deposited of any degree of opacity, according to the power of the instrument, and can be renewed at a small cost, and be readjusted by proper screws with great readiness to a distant meridian mark.

The diffraction effects peculiar to a cylindrical thread are considerably modified by a bright line formed by plane surfaces. The spider line usually employed is nearly cylindrical, and when illuminated by reflection a cylindrical image only is formed, which does not extend over the whole breadth of the line; whilst an unillumined portion, invisible to the eye, obscures part of the star disk after apparent transit.* An interesting appearance is seen when a good-sized star is put out of focus, so as to show a clearly defined enlarged disk.

As the disk transits over the transparent lines a brilliant line starts into view: at first a very short line, gradually and rapidly lengthening, and again shortening to its point of disappearance.

Applied to my 8-foot Equatoreal with $5\frac{1}{4}$-inch aperture the effect was beautiful, and produced a strong illusion of the bright line or star being stationary and the transparent bars moving. The inconvenience of artificial illumination with this instrument renders a starlit transit particularly desirable.

The silver film appears to answer very much better than any other film I have hitherto tried; for several attempts have been made with various varnishes and ruled lines; but these varnishes are apt to coalesce, and any variation in thickness and quality destroys uniformity of effect.

In solar transits, provided the brilliance of the solar disk has been sufficiently subdued, whether by Barlow's silvered lenses, polarisation, or neutral glasses, or still better by Mr. Christie's solar eyepiece, the flashing of the edge of the solar limb, as it successively passes across the transparent lines, is a phenomenon worthy perhaps of attention; but whether for solar observations this transparent method is in any degree as trustworthy as opaque line† observations is a point on which I can at present offer no opinion.

Messrs. Horne & Thornthwaite, I wish to add, have beautifully carried out the design of the writer, and have placed at the disposal of the Greenwich, Oxford, and Cambridge Observatories, and of those of Lord Lindsay and Dr. Huggins, five of these instruments.

Hartley Court, Reading,
March 6, 1876.

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* The behaviour of minute reflecting threads (especially of spun glass) under the microscope gives some pretty illustrations of cylindrical images, such as those here alluded to.

† These lines may perhaps be successfully photographed for Solar Transits.

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